Low Cost Compact MTCA.4 LLRF System

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Introduction

The MTCA.4 standard becomes more and more popular as a platform for LLRF systems. In standard approach, each system must be equipped with MCH and CPU board, which belongs to system infrastructure. For large systems, cost of infrastructure (chassis, CPU, MCH) is distributed among all used slots, so the real cost-driver are processing and acquisition boards. However, for small systems, which use only 1-2 electronic boards the basic infrastructure cost becomes significant and rises price per used slot to large amounts. The paper presents possible solution to the problem based on 1U MTCA.4 chassis. The chassis is equipped with 2 MTCA.4 compatible slots for processing boards, AMC.1 slot for optional CPU board and built in interface and management part. Possible configurations of LLRF systems are presented together with cost comparison to standard approach.

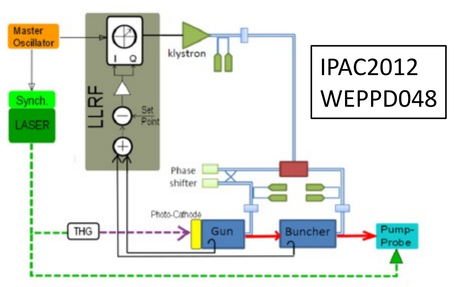
Compact LLRF

As a small system we understand:

- up to 20 measurement channels
- external synchronization
- control system running locally or on external PC
- 1 to 4 fast feedback loops

Such configuration can provide control of up to 20 cavities or control and measurements of up to 4 cavities (forward, reflected and transmitted + HPAC monitoring)

Example system:
REGAE control @ DESY



IPAC2012
WEPPD048

Standard approach

- 6 slot ELMA chassis
- NAT MCH
- CPU
- **2x SIS8300**
- **2x DWC or VM on RTM**

Component	Price
1xCPU	~1500
1xMCH	~2000
1xChassis	~2200
Total	**5700**

Price per used slot = 2850E

Only 2 out of 6 slots are used
Price overhead is large

1U mTCA.4 Crate

Main features:

- 2 mTCA.4 slots (with RTM)
- 1 AMC.1 slot (for CPU usage)
- PCIe operation without CPU
- Possibility to add RF back-plane
- Power supply+cooling units
- Management board compatible with base MCH pin-out
- Configurable back-plane interconnections (all ports on mTCA.4 boards can be used)

Starter kits
We offer starter kits based on 1U crate equipped with digitizer boards, analog front-ends and pre-installed software and firmware.

Component	Price
1xChassis+CPU+MCH	~3500
Total	**3500**

Price per used slot = 1750E

Possible applications:

- small LLRF systems
- electronics for BPMs
- Any system which requires small sets of boards distributed over larger area (e.g. electronics close to RF station)

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